Department of Energy
Ohio Field Office
Fernald Area Office
P. O. Box 538705
Cincinnati, Ohio 45253-8705
(513) 648-3155

-- 2594

NOV 02 1999

Mr. James A. Saric, Remedial Project Manager
U.S. Environmental Protection Agency
Region V-SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

DOE-0079-00

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Ms. Val Orr
Division of Drinking and Ground Waters – UIC Unit
P.O. Box 1049
1800 Watermark Drive
Columbus, Ohio 43216-1049

Dear Mr. Saric, Mr. Schneider, and Ms. Orr:

JULY 1999 OPERATING REPORT FOR THE RE-INJECTION DEMONSTRATION

This correspondence submits the Re-Injection Demonstration Operation Report for the month of July 1999.

As specified in the Re-Injection Demonstration Test Plan, monthly operating reports for the re-injection demonstration are to be prepared and submitted to the U.S. Environmental Protection Agency (U.S. EPA), Ohio Environmental Protection Agency (OEPA) Office of Federal Facilities Oversight, and the OEPA Division of Drinking and Ground Waters-UIC Unit.

NOV 02 1999

If you have any questions regarding this submittal, please contact Robert Janke at (513) 648-3124.

Sincerely,

Johnny W. Reising

FEMP:R.J. Janke

Johnny W. Reising
Fernald Remedial Action
Project Manager

Enclosure

cc w/enclosure:
R. J. Janke, OH/FEMP
G. Jablonowski, USEPA-V, SRF-5J
M. R. Rochotte, OEPA-Columbus
T. Schneider, OEPA-Dayton (three copies of enclosure)
F. Bell, ATSDR
M. Schupe, HSI GeoTrans
R. Vandegrift, ODH
AR Coordinator, FDF/78

cc w/o enclosure:
N. Hallein, EM-42/CLOV
A. Tanner, OH/FEMP
F. Barker, Tetra Tech
D. Brettschneider, FDF/52-5
K. Broberg, FDF/52-5
D. Carr, FDF/52-2
T. Hagen, FDF/65-2
J. Harmon, FDF/90
R. Heck, FDF/2
W. Hertel, FDF/52-5
S. Hinnefeld, FDF/31
T. Walsh, FDF/65-2
R. White, FDF/52-5
ECDC, FDF/52-7

MONTHLY OPERATING REPORT -- 2594
RE-INJECTION DEMONSTRATION
JULY 1999

OVERVIEW

The FEMP Re-Injection Demonstration began on September 2, 1998. The controlling document for the Re-Injection Demonstration is the Re-Injection Demonstration Test Plan, Rev. 0. A requirement of Section 6 of the test plan is that monthly operating reports be submitted to the U.S. EPA, Ohio EPA Office of Federal Facilities Oversight and the Division of Ohio EPA Drinking and Ground Waters - UIC Unit. The monthly operating reports are to include the following information:

I. Analysis of the injectate
II. The volume and rate of re-injection
III. A description of any well maintenance and rehabilitation procedures which were conducted
IV. Results of groundwater monitoring at the re-injection test site.

This report serves to fulfill this commitment for the month of July 1999. It covers operation of the Re-Injection Demonstration from July 1, 1999 through August 1, 1999.

ANALYSIS OF THE INJECTATE

Groundwater which is being extracted from the great Miami Aquifer is being treated for uranium and re-injected back into the Great Miami Aquifer. The groundwater is being treated in the FEMP Advanced Waste Water Treatment (AWWT) Expansion Facility. The effluent from the AWWT Expansion Facility is being sampled monthly for the parameters listed in Table 2.1 of the Re-Injection Demonstration Test Plan, Rev. 0. Monthly injectate sampling is focusing on the final remediation level (FRL) constituents that have had an exceedance of their FRL in the area of the aquifer from which the groundwater is being pumped. The monthly injectate samples are being sent to an off-site laboratory for analysis.

Preliminary results from the injectate sample collected in July are provided in Table 1. These results indicate that all the constituent concentrations, with the exception of total uranium, are below their respective FRLs. The FRL for total uranium is 20 μg/L. The concentration of total uranium in the July injectate sample was 26.8 μg/L. This is the first time that the concentration of total uranium in a monthly injectate grab sample has exceeded the groundwater FRL. DOE confirmed that the value was reported correctly by the lab.

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The July injectate sample was collected on July 15, 1999 and sent to an offsite laboratory for analysis. A preliminary total uranium result for the July injectate sample was received on August 25, 1999. The result was inconsistent with daily composite process control sampling data, therefore an evaluation was initiated. Several notifications and information packets concerning this exceedance and the subsequent evaluation have been submitted prior to this report.

- On September 17, 1999, electronic mail was sent that provided information concerning events surrounding the July FRL exceedance for uranium. A copy of the electronic mail is provided as Attachment 1.
- On September 24, 1999, a formal notification letter for the July uranium FRL exceedance was sent. A copy of the letter is provided as Attachment 2.
- On October 5, 1999 a fax was sent in support of the weekly teleconference with U.S EPA and Ohio EPA. The fax provided additional details concerning the exceedance. A copy of the fax is provided as Attachment 3.

The first two submittals were sent to the U.S. EPA, Ohio EPA Office of Federal Facilities Oversight and the Division of Ohio EPA Drinking and Groundwaters - UIC Unit while the third submittal was only sent to U.S. EPA and Ohio EPA Office of Federal Facilities Oversight. As stated at the end of Attachment 3, the FEMP is continuing to evaluate measures taken to keep the injectate uranium level below 20 ppb. Updates have and will continue to be provided in the weekly teleconference with U.S. EPA and Ohio EPA.

In the June Monthly Operating Report for the Re-Injection Demonstration, it was reported that an FRL exceedance for bis(2-ethylhexyl)phthalate was measured in the June Injectate sample. The groundwater FRL for bis(2-ethylhexyl)phthalate is 6 µg/L. As anticipated, the concentration of bis(2-ethylhexyl)phthalate in the July injectate sample was below the FRL (undetectable at 5 µg/L). As explained in the June report, the one time exceedance in June is being attributed to laboratory contamination and is not representative of the quality of the treated groundwater being re-injected back into the aquifer.

VOLUME AND RATE OF RE-INJECTION

Treated groundwater is being re-injected into the Great Miami Aquifer in five re-injection wells at a rate of 200 gallons per minute, per well. Figure 1 illustrates the location of the five re-injection wells. Re-Injection Well 8 is an 8-inch diameter well. Re-Injection Well 9 is a 12-inch diameter well. The other re-injection wells are all 16 inches in diameter. The combined design re-injection rate for all five

wells is 1000 gallons per minute. Operational data specific to each re-injection well are provided in Tables 2 through 6.

Figure 2 illustrates the water level rise in each of the five re-injection wells from July 1, 1999 through August 1, 1999, as measured by the operators at the AWWT Expansion Facility Distributed Control System (DCS). Water levels are recorded three times per day. Water levels inside the re-injection wells are monitored as an indicator of plugging within the wells. As a well screen becomes plugged, the water level in the well rises to compensate for the greater pressure needed to maintain a constant re-injection rate.

WELL MAINTENANCE AND REHABILITATION

No well maintenance or rehabilitation work was required or performed on the five re-injection wells during the month of July.

GROUNDWATER MONITORING RESULTS

Water quality samples for the Re-Injection demonstration are collected quarterly and analyzed for major anions, cations, and total uranium. The first round of water quality data was collected in August 1998, prior to the start of re-injection. Results of the August sampling event were reported in the September monthly report. The second round of water quality samples was collected in December 1998. Results of the December sampling event were reported in the January monthly report. The third round of water quality samples for the re-injection demonstration was collected in March 1999. Results of the March sampling event were reported in the April monthly report. The fourth round of sampling will be collected during the months of June through August. At the end of the one year Re-Injection Demonstration, the water quality data collected quarterly during the demonstration will be used to illustrate water quality conditions over the course of the demonstration.

TABLE 1

ANALYSIS OF INJECTATE - PRELIMINARY RESULTS
Sample Collected July 14, 1999

Constituents[a]	Result[b]	Groundwater FRL[c]	Detection Limit	Constituent Type[e]	Basis for FRL[f]
General Chemistry		**mg/L**			
Nitrate	0.360 J	11.0		MP	B
Inorganics		**mg/L**			
Antimony	0.00031 B	0.006		N	A
Arsenic	0.0022 B	0.05		N	A
Barium	0.0503	2.0		N	A
Beryllium	0.00022 B	0.004		N	A
Cadmium	U	0.014	0.00031	N	B
Total Chromium	0.0011 B	0.022[d]		MP	R
Cobalt	0.00016 B	0.17		N	R
Lead	0.00042 B	0.015		N	A
Manganese	0.0038 B	0.9		N	B
Mercury	U	0.002	0.00012	MP	A
Nickel	0.002 B	0.1		N	A
Selenium	0.0008 B	0.05		N	A
Silver	0.00015 B	0.05		N	R
Vanadium	0.0011 B	0.038		N	R
Zinc	0.0089 B	0.021		N	B
Radionuclides		**pCi/L**			
Neptunium-237	U	1.0	0.008	MP	R*
Radium-226	U	20.0	-0.187	N	A
Strontium-90	U	8.0	0.287	MP	A
Thorium-228	U	4.0	-0.006	N	R*
Thorium-232	U	1.2	0	N	R*
		µg/L			
Total Uranium	**26.8**	**20.0**		**MP**	**A**
Organics		**µg/L**			
Bis(2-ethylhexyl)phthalate	U	6.0	5	N	A
Carbon disulfide	U	5.5	5	N	A
1, 1-Dichloroethene	U	7.0	5	N	A
1, 2-Dichloroethane	U	5.0	1	MP	A
Trichloroethene	U	5.0	3	N	A

[a]Constituents taken from Table 2-1 of Re-Injection Demonstration Test Plan. Constituents are those previously detected in aquifer zones 2 and 4 at concentrations above their FRL.

[b]If a duplicate sample was analyzed the highest concentration between the regular sample and duplicate sample is reported.
B = Lab qualifier(inorganic). Reported value was obtained from a reading that was less than the contract required detection limit but greater than or equal to the instrument detection limit.
J = Lab Qualifier, means data is estimated.
U = Nondetect

[c]From Table 9-4 in OU5 ROD.

[d]FRL is for hexavalent chromium.

[e]Constituent types from Appendix A of IEMP. MP indicates that the constituent has been identified as being able to migrate to the aquifer. N indicates that the constituent has been identified as not being able to migrate to the aquifer.

[f]A - Applicable or relevant and appropriate requirement based (MCL, PMCL, etc.).
B - Based on 95th percentile background concentrations.
R - Risk-based
R* - Risk-based radionuclide cleanup levels include constituent specific 95th percentile background concentration.

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TABLE 2

RE-INJECTION WELL 22107 (IW-8)
OPERATIONAL SUMMARY SHEET
JULY 1999

Reference Elevation (feet AMSL) - 539.92 (top of casing)
Northing Coordinate ('83) - 476196.22
Easting Coordinate ('83) - 1347978.25

Hours in reporting period[a] = 744.03
Hours not injecting[b] = 3.00
Hours injecting[c] = 741.03
Operational percent[d] = 99.6

Target Injection Rate = 200 gpm

Monthly Measurements		
Month	Million Gallons Injected[e]	Average Operating Injection Rate (gpm)[f]
9/98	8.16	206
10/98	5.78	203
11/98	8.47	196
12/98	5.76	222
1/99	5.35	227
2/99	7.06	196
3/99	7.34	205
4/99	7.75	197
5/99	7.46	216
6/99	8.42	197
7/99	8.93	201

[a]First operational shift reading on 7/1/99 to first operational shift reading on 8/1/99
[b]Downtime.
[c]Hours in reporting period - Hours not injecting
[d](Hours injecting/Hours in reporting period) x 100
[e]Summation of daily totalizer differences
[f]Million Gallons Injected/(Hours Injecting x 60)

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TABLE 3

RE-INJECTION WELL 22108 (IW-9)
OPERATIONAL SUMMARY SHEET
JULY 1999

Reference Elevation (feet AMSL) - 578.025 (top of casing)
Northing Coordinate ('83) - 476255.74
Easting Coordinate ('83) - 1348384.49

Hours in reporting period[a] = 743.63
Hours not injecting[b] = 5.14
Hours injecting[c] = 738.49
Operational percent[d] = 99.3

Target Injection Rate = 200 gpm

Monthly Measurements		
Month	Million Gallons Injected[e]	Average Operating Injection Rate (gpm)[f]
9/98	8.17	206
10/98	8.30	201
11/98	8.53	197
12/98	5.66	214
1/99	4.33	181
2/99	6.07	156[g]
3/99	5.93	178[h]
4/99	6.66	184
5/99	7.83	200
6/99	8.41	197
7/99	8.79	198

[a]First operational shift reading on 7/1/99 to first operational shift reading on 8/1/99
[b]Downtime.
[c]Hours in reporting period - Hours not injecting
[d](Hours injecting/Hours in reporting period) x 100
[e]Summation of daily totalizer differences
[f]Million Gallons Injected/(Hours Injecting x 60)
[g]Injection out of smaller downcomer in February. Target Injection rate of smaller downcomer is 150 gpm.
[h]Injection out of smaller downcomer up until March 8. Large downcomer was used from March 11 to April 1, 1999.

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TABLE 4

RE-INJECTION WELL 22109 (IW-10)
OPERATIONAL SUMMARY SHEET
JULY 1999

Reference Elevation (feet AMSL) - 576.92 (top of casing)
Northing Coordinate ('83) - 476175.65
Easting Coordinate ('83) - 1348860.53

Hours in reporting period[a] = 743.63
Hours not injecting[b] = 5.22
Hours injecting[c] = 738.42
Operational percent[d] = 99.3

Target Injection Rate = 200 gpm

Monthly Measurements		
Month	Million Gallons Injected[e]	Average Operating Injection Rate (gpm)[f]
9/98	8.13	205
10/98	8.28	200
11/98	8.50	196
12/98	5.72	217
1/99	5.48	229
2/99	8.09	208
3/99	8.13	204
4/99	5.35	190
5/99	8.25	197
6/99	8.36	196
7/99	8.81	199

[a]First operational shift reading on 7/1/99 to first operational shift reading on 8/1/99
[b]Downtime.
[c]Hours in reporting period - Hours not injecting
[d](Hours injecting/Hours in reporting period) x 100
[e]Summation of daily totalizer differences
[f]Million Gallons Injected/(Hours Injecting x 60)

000009

TABLE 5

RE-INJECTION WELL 22240 (IW-11)
OPERATIONAL SUMMARY SHEET
JULY 1999

Reference Elevation (feet AMSL) - 577.14 (top of casing)
Northing Coordinate ('83) - 476422.82
Easting Coordinate ('83) - 1349386.92

Hours in reporting period[a] = 743.38
Hours not injecting[b] = 3.00
Hours injecting[c] = 740.38
Operational percent[d] = 99.6

Target Injection Rate = 200 gpm

	Monthly Measurements	
Month	Million Gallons Injected[e]	Average Operating Injection Rate (gpm)[f]
0/98	8.39	211
10/98	8.29	199
11/98	8.50	197
12/98	5.68	216
1/99	5.53	230
2/99	8.06	208
3/99	8.04	204
4/99	7.56	192
5/99	8.34	199
6/99	8.42	197
7/99	8.85	199

[a]First operational shift reading on 7/1/99 to first operational shift reading on 8/1/99
[b]Downtime.
[c]Hours in reporting period - Hours not injecting
[d](Hours injecting/Hours in reporting period) x 100
[e]Summation of daily totalizer differences
[f]Million Gallons Injected/(Hours Injecting x 60)

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TABLE 6

RE-INJECTION WELL 22111 (IW-12)
OPERATIONAL SUMMARY SHEET
JULY 1999

Reference Elevation (feet AMSL) - 583.01 (top of casing)
Northing Coordinate ('83) - 476518.64
Easting Coordinate ('83) - 1350105.39

Hours in reporting period[a] = 743.40
Hours not injecting[b] = 3.00
Hours injecting[c] = 740.40
Operational percent[d] = 99.6

Target Injection Rate = 200 gpm

Monthly Measurements		
Month	Million Gallons Injected[e]	Average Operating Injection Rate (gpm)[f]
09/98	8.12	205
10/98	8.27	201
11/98	8.53	197
12/98	5.61	219
1/99	5.08	212
2/99	8.06	208
3/99	8.13	203
4/99	7.65	195
5/99	8.27	197
6/99	8.42	197
7/99	8.80	198

[a]First operational shift reading on 7/1/99 to first operational shift reading on 8/1/99
[b]Downtime.
[c]Hours in reporting period - Hours not injecting
[d](Hours injecting/Hours in reporting period) x 100
[e]Summation of daily totalizer differences
[f]Million Gallons Injected/(Hours Injecting x 60)

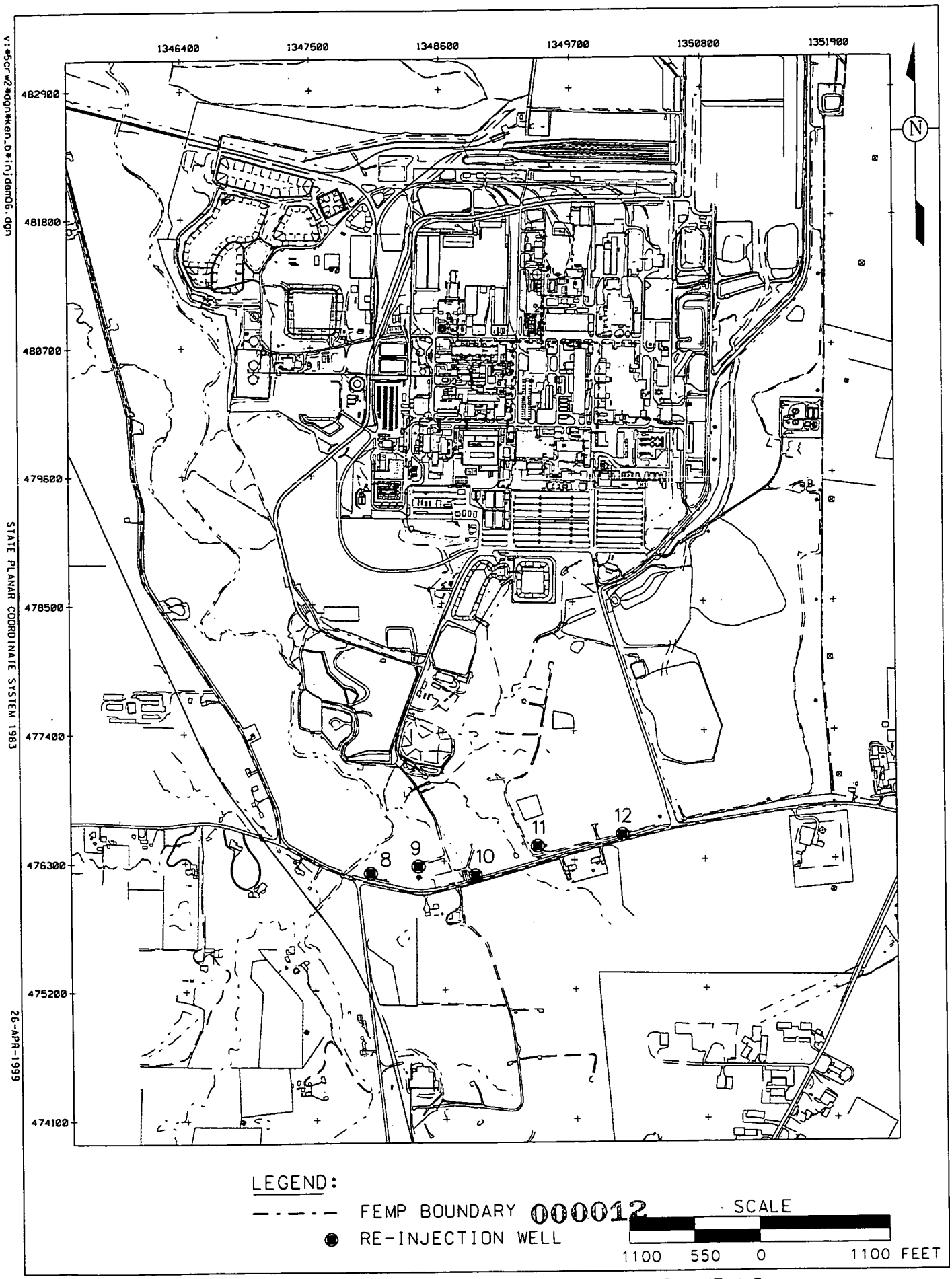

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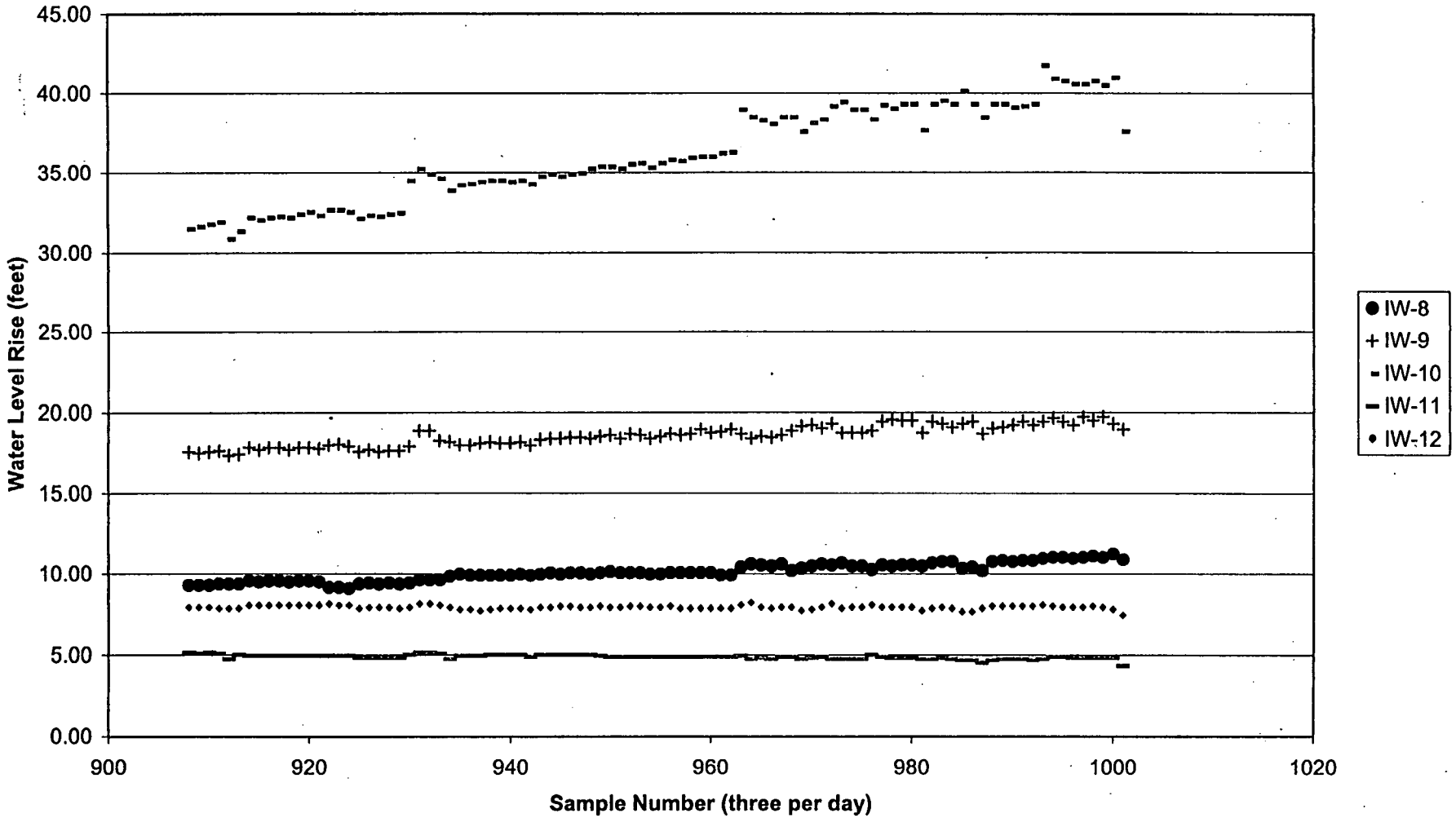
FIGURE 1. LOCATION OF RE-INJECTION WELLS

Figure 2
Re-Injection Wells, Water Level Rise
First Shift July 1, 1999 to August 1, 1999



ATTACHMENT 1

ELECTRONIC MAIL CORRESPONDENCE SENT ON 9/17/99

Author: Rob Janke at FNST-06
Date: 9/17/1999 4:38 PM
Normal

2594

TO: donna.bohannon@epa.state.oh.us at FE-INTERNET, hodgef@ttemi.com at FE-INTERNET, Jablonowski.Eugene@EPAmail.EPA.gov at FE-INTERNET, jcolleli@gw.odh.state.oh.us at FE-INTERNET, michelle.waller@epa.state.oh.us at FE-INTERNET, Saric.James@EPAmail.EPA.gov at FE-INTERNET, Tom.Ontko@EPA.state.Oh.US at FE-INTERNET, Tom.Schneider@EPA.state.oh.us at FE-INTERNET, valerie.Orr@EPA.state.oh.us at FE-INTERNET
CC: David Brettschneider at FNST-02, William Hertel at FNST-02, Ken Broberg at FNST-02, Terence Hagen, Dennis Carr at FNST-02, Marc Jewett at FNST-02, Jyh-Dong Chiou at FNST-02, Everett Henry at FNST-02, Kathi Nickel, Johnny Reising, Chris Sutton at FNST-04
Subject: POTENTIAL EXCEEDANCE OF 20 PPB U ON INJECTATE WATER
---------- Message Contents

Hello,

The purpose of this Email is to provide notification that the injectate waters used for the Reinjection Demonstration Project have recently exhibited concentrations of uranium above 20 ppb uranium. Although monitoring results have indicated that total uranium concentrations have exceeded the 20 ppb Final Remediation Level, we do not believe these levels have or are indicative of the overall quality of the injectate being used. Further discussion and details are provided below along with a request to discuss this issue further on Tuesday's DOE/EPA conference call.

This notification is being provided consistent with the Reinjection Demonstration Test Plan (Dated February, 1998), which states:

(1) The Ohio EPA UIC (Underground Injection Control Unit) will be notified.
(2) A determination wil be made as to why the exceedance is occurring.
(3) A change to the treatment process for the injectate will be considered.
(4) Depending on the magnitude and persistence of the exceedance, a decision to stop reinjection may be made.

BACKGROUND:

Injectate waters are generated through the operation of the Southfield, South Plume, and South Plume Optimization extraction well fields. Upon extraction and conveyance of this groundwater to the Advanced Waste Water Treatment (AWWT) facility, it is treated for uranium removal through the Expansion phase of the AWWT facility.

Injectate water quality is monitored through the Expansion phase of the AWWT Facility to the Reinjection Surge Tank, which is the last stop prior to reinjection. The injectate water quality monitoring process consists of obtaining samples from two places and analyzing for total uranium: (1) after treatment (effluent AWWT Expansion) through collection of daily composite samples and (2) monthly through collection of a reinjection demonstration grab sample at the Reinjection Surge Tank. The Surge Tank is a 50,000 gallon tank which receives treated waters (to be used as injectate) from the Expansion phase of the AWWT Facility. Separate from these sampling points, process control samples are also obtained from the Expansion phase of the AWWT Facility. The process control samples consist of composite samples, collected by obtaining 3 samples per day per ion exchange vessel. Process control samples are also analyzed for total uranium.

The Reinjection Surge Tank has a working capacity of 37,500 gallons. With an injection rate of 1,000 gpm; this tank will turnover 38.4 times per day. As a result, a grab sample from this tank represents a small portion of what was actually injected for the a given 24 hour period.

RESULTS:

During June, 1999, as described in the June Reinjection Demonstration Monthly Report, total uranium concetrations were generally above 10 ppb but well below 20 ppb. As outlined in the Operations and Maintenance Master Plan (OMMP), preparations to regenerate ion exchange resin within the Expansion phase of the AWWT Facility commenced with the increase of the total uranium concentration to 10 ppb.

We have recently received analytical data from monitoring results taken in July. Some of the July (specifically July 10 - 14, 1999) daily composite (effluent at the Expansion phase) sample results seem to indicate that injectate water was used which exhibited concentrations of total uranium greater than the 20 ppb uranium Final Remediation Level (FRL) for groundwater (analytical results ranged from approximately 20 to 24 ppb). On July 14, 1999 a monthly grab sample from the Surge Tank was taken and later analyzed indicating a total uranium concentration of 26.8 ppb.

These results are still being evaluated, however, along with operational logs, because process control sample results from the individual treatment trains of the AWWT Expansion phase, during the same time period, indicate total uranium levels less than 15 ppb. Another issue that has been identified for this time period (July 10 - 14, 1999) was the possibility of a contaminated sample tube used to collect the daily composite sample, since after cleaning/replacement of the sample lines the composite results (July 15, 1999) returned to less than 15 ppb which closely compares to the process control results taken from the individual treatment trains.

On July 14, 1999, a significant operation event was, however, initiated. The event which occurred during the morning of July 14th, during the process of regenerating ion exchange vessel 3A in the AWWT Expansion phase, consisted of a fast rinse cycle on vessel 3A. As a result of the regeneration process-based fast rinse it is possible that some of the rinse water could leaked past the shut-off value and gone to the discharge line. The Reinjection Surge Tank was sampled at 10:30 am coinciding with the fast rinse of vessel 3A. Therefore, the result of 26.8 ppb could be accurate (if we accept the possibility of rinse water being discharged through a leaking value to discharge) but it does not represent the average uranium content of the injectate for July 14, 1999. For the remainder of July, 1999 all results were less than 15 ppb total uranium.

August, 1999 reinjection demonstration monitoring results were all less than 15 ppb total uranium. At the end August, when the majority of the analytical results and information was available and could be pieced together, daily grab sampling was initiated at the Reinjection Surge Tank to provide more information.

September monitoring results have generally been around 10 to 12 ppb total uranium. However, between September 4 - 7, 1999, grab samples at the Reinjection Surge Tank were 18 ppb, 16.3 ppb, 19 ppb and 20.3 ppb, respectively. The corresponding daily composite samples taken from the AWWT Expansion phase effluent, for the same 4 days, were 13.9 ppb, 18 ppb, 17.6 ppb, and 16.9 ppb, respectively. Efforts continue to collect and evaluate the September monitoring results.

PATH FORWARD:

Again, the purpose of this Email is to convey the issue and details, to the extent known, with the injectate water and with your help plan the appropriate path forward. In this regard, we would like to discuss this issue on the Tuesday (September 21, 1999), DOE/EPA conference call, or when a better time can be scheduled.

Given all the monitoring results, we do not believe we have or are injecting treated groundwater which exceeds the 20 ppb total uranium FRL for any 24 hour period. Clearly, the effluent from the AWWT Expansion phase is exhibiting concentrations of total uranium which demand attention and discussion. Additional attention is being focused on accelerating the ion exchange regeneration process. Other

initiatives to improve the treatment/ion exchange regeneration process can hopefully be discussed on the conference call.

If you should have any questions, please do not hesitate to give me a call (513) 648-3124. Thanks.

Rob Janke

--2594

ATTACHMENT 2

LETTER: MR. JOHNNY W. REISING TO MR. JAMES A SARIC, U.S. EPA, MR. TOM SCHNEIDER, OHIO EPA, MS. VAL ORR, OHIO EPA, NOTIFICATION OF SAMPLE ANALYSIS RESULTS INDICATING GREATER THAN 20 µG/L URANIUM CONCENTRATION IN THE JULY INJECTATE SAMPLE, DATED SEPTEMBER 24, 1999

Department of Energy
Ohio Field Office
Fernald Area Office
P. O. Box 538705
Cincinnati, Ohio 45253-8705
(513) 648-3155

2594

SEP 24 1999

Mr. James A. Saric, Remedial Project Manager
U.S. Environmental Protection Agency
Region V-SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

DOE-1140-99

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Ms. Val Orr
Division of Drinking and Ground Waters - UIC Unit
P.O. Box 1049
1800 Watermark Drive
Columbus, Ohio 43216-1049

Dear Mr. Saric, Mr. Schneider, and Ms. Orr:

NOTIFICATION OF SAMPLE ANALYSIS RESULTS INDICATING GREATER THAN 20 ug/L URANIUM CONCENTRATION IN THE JULY INJECTATE SAMPLE

This notification is being provided per the requirements of the Department of Energy's (DOE) Re-Injection Demonstration Test Plan. As discussed during the DOE, U.S. Environmental Protection Agency (U.S. EPA), and Ohio Environmental Protection Agency (OEPA) conference call of September 21, 1999, the monthly injectate grab sample results for July exceeded 20 ug/L. Details concerning the issues surrounding the anomalous uranium data were provided to you by Robert Janke via electronic mail on September 17, 1999. As you know, the significance of the July sample result is being questioned as the daily composite process control data collected at that time contradict the monthly grab sample results. However, it appears that the exceedance was of a very limited duration.

DOE considers injection of water with concentrations of uranium greater than 20 ug/L to be a very serious matter and will therefore communicate issues such as this in a more timely manner in the future. We have increased our vigilance in monitoring the injectate and will shut down the re-injection system if it appears that we are in danger of injecting water exceeding 20 ug/lL uranium. DOE will be evaluating trends in the uranium concentration of the injectate and is reviewing the water treatment facilities' ion exchange

resin regeneration process. This effort is intended to improve the timeliness of the application of regeneration and its efficiency in providing a product capable of meeting DOE's goals and commitments regarding quality of the injectate.

We will be working closely with Mr. Saric of the U.S. EPA and Mr. Tom Schneider of the Office of Federal Facilities Office within the OEPA as we address this situation and will keep them informed of our progress.

Please contact Robert Janke at (513) 648-3124 if you have any questions regarding this notification.

Sincerely,

for Johnny W. Reising
Fernald Remedial Action
Project Manager

cc:
N. Hallein, EM-42/CLOV
A. Tanner, OH/FEMP
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G. Jablonowski, USEPA-V, SRF-5J
F. Bell, ATSDR
M. Schupe, HSI GeoTrans
R. Vandegrift, ODH
F. Barker, Tetra Tech
D. Brettschneider, FDF/52-5
K. Broberg, FDF/52-5
D. Carr, FDF/52-2
T. Hagen, FDF/65-2
J. Harmon, FDF/90
R. Heck, FDF/2
W. Hertel, FDF/52-5
S. Hinnefeld, FDF/31
T. Walsh, FDF/65-2
R. White, FDF/52-5
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ATTACHMENT 3

FAX SUPPORTING WEEKLY TELECONFERENCE WITH U.S. EPA
AND OHIO EPA SENT 10/5/99

AQUIFER RESTORATION/WASTEWATER PROJECT (ARWWP)

1. Operations Status/Issues:

   A. Extraction Wells and Injection Wells
   - All extraction wells on-line as per Operating Order no. 25 (Wells 13, 14, & 16 to bypass as per cc:mail dated 9/30/99
   - Injection wells restarted 9/30/99
   - Pump removed from well 15 for use as replacement of failed pump

   B. Treatment Systems
   - Phase I on primarily stormwater, with groundwater. Set point at 600 gpm, discharge U concentration at 3.8 average last 3 days
   - Phase II on backwash with small stream of groundwater, discharge U conc. at 8.3 ave. last 3 days
   - Phase III on groundwater with set point of 1200 gpm, discharge U concentration at 11.3 average last 3 days. IX train No. 2 off line awaiting generation of regeneration of vessel 2A. Backwashing the vessel started Monday 10/3 in preparation for regeneration
   - SPIT and IAWWT on-line at 200 and 300 gpm set points, with discharge U conc. at 1.4 and 4.4.
   - SWRB, east basin at 3 feet, water started overflowing into west basin early on day shift Monday, 10/3
   - Parshall Flume U conc. exceeding 20 due to the quantity of groundwater being bypassed. 9/30 = 20.5, 10/1 = 24.9, 10/2 = 23.4, 10/3 back down to 17.3 with Phase I taking more groundwater
   - DCS verified as Y2K compliant

   C. Slurry Dewatering Facility
   - No operational issues

2. OSDF Groundwater and Leak Detection Monitoring Status/Issues:

   - LDS Accumulation Rates: Cell 1 0.48 gpad as of 9/4, Cell 2 0.9 gpad as of 9/11/99
   - Response to 2nd round OEPA comments on the Technical Memorandum for Cell 1 Baseline to be sent this week. Response was FAXED in July but has not been resolved. Will need to discuss the response during a future call or in a meeting.

3. Groundwater Restoration Program Status/Issues:

   - Geoprobe Update: Planning to conduct a Pre-design Geoprobe effort this winter for the waste storage area. Scheduled to begin in early November.
   - Modeling status: Continue to work on Phase 2 of the groundwater model upgrade

- IEMP, data, reporting: IEMP report for the second quarter 1999 and responses to EPA and OEPA comments on both the 1998 Annual Site Environmental Report and the 1st quarter 1999 report were submitted concurrently on September 24.

4. Engineering and Construction Project (including Leachate Conveyance System) Status/Issues:

1. South Field Additional Extraction Well Project
    1. Notice-To-Proceed and Construction Kick-off meeting held on October 4th
    2. Extraction Well Number 23 is complete and currently being developed
    3. Extraction Well Number 24 drilling scheduled to begin October 4th
    4. Construction and Startup scheduled to be complete by February 25, 2000

2. AWWT Backwash Reroute Project
    1. Tie-In to existing system performed during recent Y2K shutdown
    2. Construction was started in September and is scheduled to be completed in December

3. AWWT Groundwater Reroute Project
    1. Construction was started late September and is scheduled to be completed in December

4. Permanent Leachate Transmission System Project
    - 90% Conceptual Design was completed on September 16th by GeoSyntec
    - Conceptual design review comments are currently being incorporated
    - Final Conceptual Design which includes drawings, discussion, and results of a comparison of the Conceptual Design to the DCP will be issued to the EPA late October
    - Detail Design began on October 1st
    - 90% Design Submittal (DCN) scheduled for December 29th

A. FY2000 Engineering and Construction Projects
    - Nothing to report

Supplemental Injection Wells
Increase Flow at SPIT and IAWWT
Resin Regeneration Station
ARASA Basin Reroute
Warehouse and Garage for AWWT
IAWWT Trailer Overhaul
Backup generator for AWWT
Replace Vacuum Truck
STP Uranium Treatment

DISCUSSION OUTLINE
REINJECTION/AWWT REGENERATION
ISSUES AND PROPOSED PATH FORWARD

October 5, 1999

ISSUES:

- o Timeliness of notification of uranium FRL concentration exceedances in the AWWT Expansion Phase discharge effluent, which is used as injectate.
- o Reporting requirements in the Reinjection Demonstration Test Plan and the Operations and Maintenance Master Plan for the Aquifer Restoration and Wastewater Project.
- o Reversing the increasing trend of uranium concentrations in the injectate waters.
- o Potential impacts to the aquifer restoration schedule if uranium concentrations are greater than 5 ppb, 10 ppb, and 15 ppb (less than 20 ppb).
- o Potential impacts to the Outfall uranium discharge concentration with the AWWT Expansion Phase effluent > 5 ppb, >10 ppb, and > 15 pbb.
- o Addressing the EPA expectation that the uranium concentration of the injectate (effluent from the AWWT Expansion Phase discharge) will always be low; <5 ppb, <10 ppb, <20 ppb.

BACKGROUND:

- Reporting requirements for the quality of the AWWT Expansion Phase discharge are prescribed in the Re-Injection Demonstration Test Plan, which is the controlling document for the Re-Injection Demonstration. A monthly grab sample of the AWWT Expansion Phase discharge is collected at the surge tank (just prior to re-injection) and submitted to an offsite lab for analysis of specific groundwater FRL constituents listed in the plan, including uranium. Results from this sample are reported to the EPA via a monthly operating report. These reports are submitted approximately three months after each reporting month.
- Operating procedures for the AWWT Expansion System are outlined in the Operations and Maintenance Master Plan for the Aquifer Restoration and Wastewater Project, Rev 1, and carried out via task specific procedures, operating work instructions, and standing orders. The AWWT Expansion Phase System is the source of injection water for the re-injection system. Daily composite samples of the combined AWWT Expansion Phase discharge and its' individual treatment trains are collected and analyzed for uranium. Operational decisions concerning the AWWT Expansion Phase are based on the results of these daily samples. The OMMP provides direction if the AWWT Expansion Phase discharge should reach, or exceed 10 ppb uranium. The OMMP does not prescribe any EPA reporting requirements for data collected from the composite samples.
- It was recognized in January, 1999, when the monthly composite, average, uranium concentration at the Parshall Flume exceeded 20 ppb, that the primary factors leading to the outfall exceedance were associated with the AWWT Facility's Ion Exchange Regeneration Process.

- The problems at the AWWT Facility which are associated with the Ion Exchange Regeneration include (1) inability to consistently regenerate ion exchange resin on a regular basis, (2) difficulty with managing large quantities of concentrated uranium/brine solutions after regeneration, (3) ion exchange vessel valves leaking during regeneration resulting in small quantities, but high concentrations of uranium being mixed with either the effluent stream going to discharge or used as injectate, and (4) operational related hiccups which, similar to leaking valves, can result in small quantities yet high concentrations of uranium being added to either the outfall or injectate effluents.

- Informal project team formed in January, 1999

- Laboratory bench scale tests on regeneration efficiency began in February, 1999
  1. Numerous bench scale tests have confirmed the validity of using saturated NaCl brine as a regenerant.
  2. Typically, about 90% of adsorbed resin is removed in the first bed volume, 95 to 98% after three bed volumes, and 98 to 100% after five bed volumes.
  3. Thus, laboratory studies suggest that 5 bed volumes of regenerant is a reasonable goal for operations regeneration.

- Visit by Dow Chemical and Savannah River IX experts in March, 1999. They suggested coring representative IX vessels to see how uranium is distributed within resin beds; i.e. search for evidence of channeling or preferential flow pathways
  1. 1800-3A vessel cored in June.
  2. Top two thirds of resin loaded with 22,000 ppm uranium; bottom third tails off to approximately zero ppb
  3. Resin profile is in accordance with IX theory.
  4. Ease of coring 1800 series vessel suggests use of core samples before and after regeneration as a performance measure.

- Regeneration of IX vessel started on July 12, 1999 and completed on August 16, 1999. Vessel put into service in lead position on August 16, 1999, and then switched to lag position on August 17, 1999.
  1. Analytical data of core samples before and after regeneration indicated that 99 + % of uranium was removed from resin. Uranium concentration in effluent of 1800-3A has been < 1.0 ppb since August 24, 1999.
  2. Both of the above indicate that regeneration was successful.
  3. However, four brine elution sequences were performed (brine elution, slow rinse, and fast rinse)
  4. The overall process resulted in considerable volumes of waste eluate to be processed at the AWWT slurry dewatering facility (about 85,000 gallons of brine and slow rinse water) and wastewater reworked through the Phase II system (about 250,000 gallons of fast rinse water).
  5. Due to the need to treat the waste material following each brine elution sequence, the regeneration spanned almost five weeks.

- A detailed analysis and interpretation of the 1800-3A regeneration was carried out with the objective of 1) showing what and why decisions were made, 2) to delineate lessons learned, and 3) to incorporate the lessons learned to formulate new work plans and to formulate performance measures and criteria for the next regeneration.
  1. A faulty valve resulted in insufficient contact between brine and resin in the first brine regeneration. This caused the uranium to move from top to bottom of the resin bed, with subsequent high bleed rates in slow and fast rinse. The high uranium on the bottom portion of the resin was confirmed by coring.
  2. Uranium concentrations in the slow rinse (even after 12 bed volumes) did not fall below 300 ppb. Accordingly, core samples of the resin were again taken.
  3. While waiting for analytical results, the resin was regenerated and rinsed with two more sequences. Although the uranium concentration in the rinse water of the 4th regeneration effort never did get below 200 ppb, analytical data from the core samples indicated that 99% of the uranium on the resin had been removed.
  4. The analytical data combined with calculations indicated that only about 1 to 2 lbs of uranium at most remained on or in the resin. Even if all of this uranium bled onto the lag vessel, it would only amount to 1 to 2 % of the ultimate cumulative loading on the resin. Therefore the decision was made to put 3A into service in lead position until all of the uranium was rinsed out by ground water going through the resin.
  5. After about 16 hours the uranium concentration in the eluate of 3A was 2.3 ppb, and the vessel was switched to lag position where it has performed very since.

- Based upon observations and lessons learned from the regeneration of 3A, a set of goals and a series of system checks were developed to endure that the next regeneration proceeds according to plan and in a fashion that is operationally efficient.

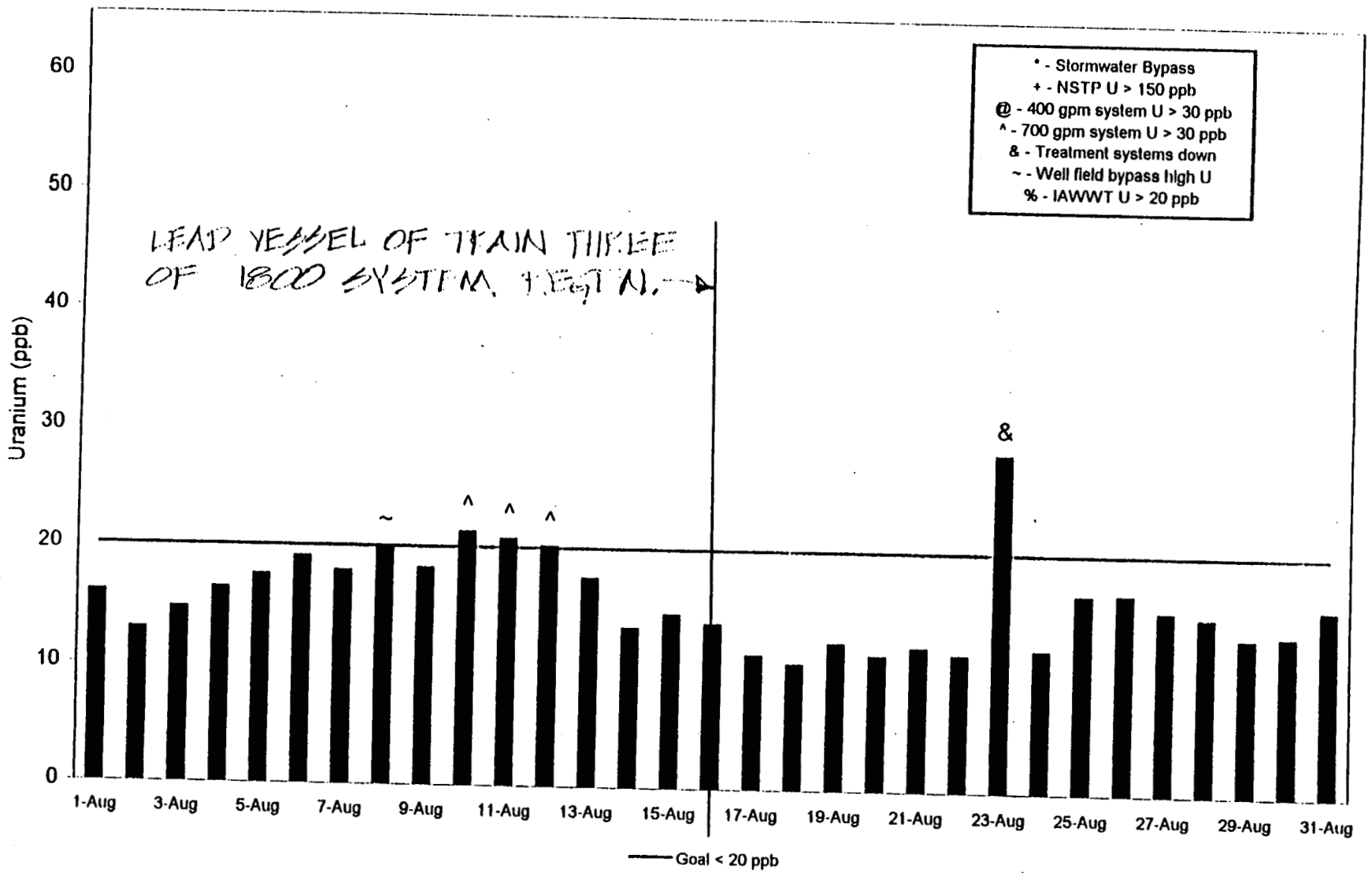
PATH FORWARD:

- Since January, 1999, efforts have been underway to better understand and correct the problems noted above. The focus of these efforts continue in the following areas: (1) developing an ion exchange regeneration (process) procedure which is timely, consistently successful, and does not generate large quantities of eluate which can not be effectively managed at the Sludge Dewatering Facility and (2) improving the operational philosophy and procedural rigor associated with the AWWT Expansion Phase processes to help eliminate operational hiccups and ensure that uranium concentrations in its effluent are less than 20 ppb.

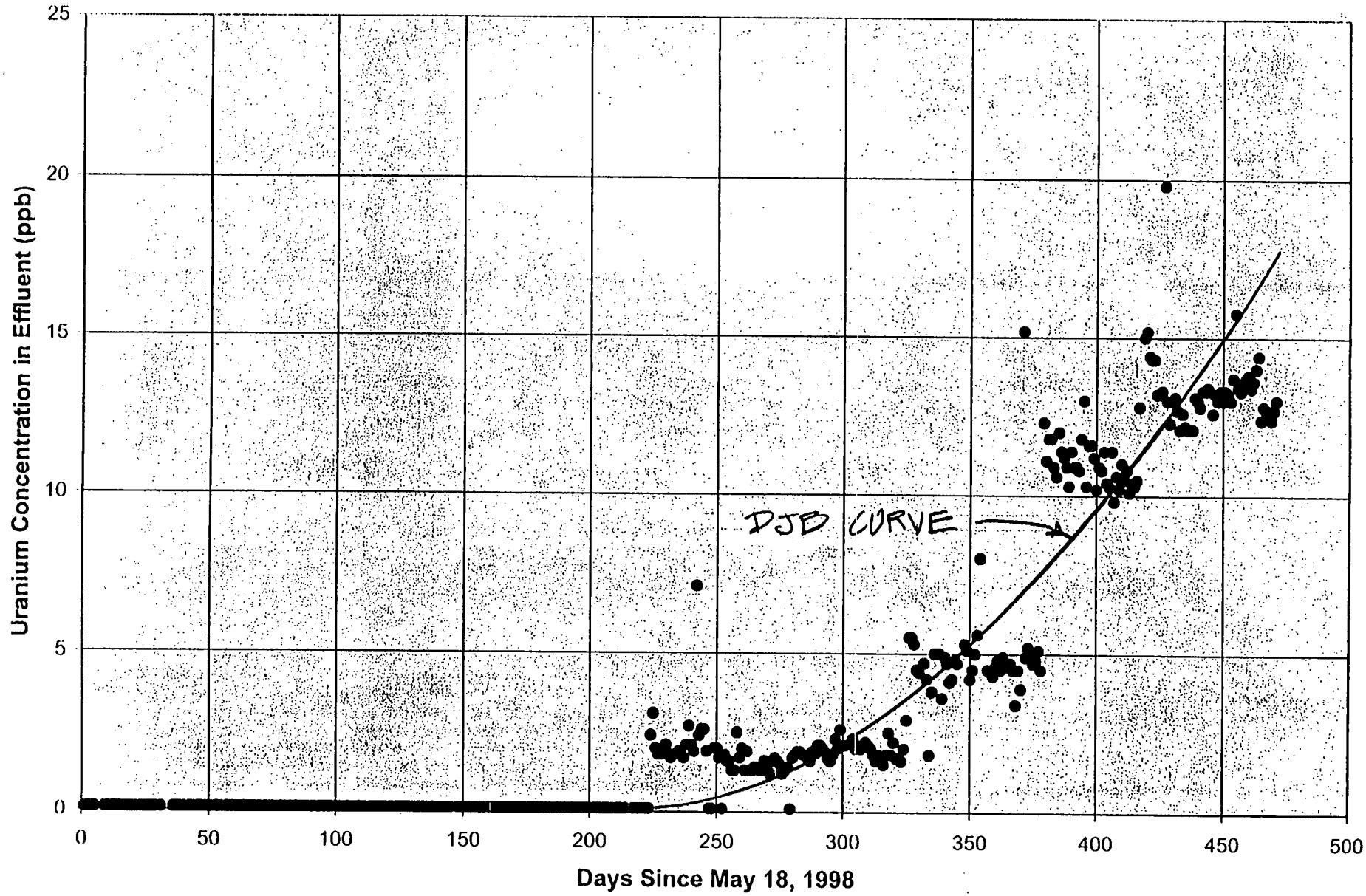
- The regeneration of Vessel 2A began on October 14, 1999, and so far is proceeding to plan. As mentioned above the plan was heavily based upon observations and lessons learned from the regeneration of 3A.

- The regeneration of 1A will follow 2A when it has been demonstrated that 2A has been successful---a period of several weeks. 1A will incorporate lessons learned from the regeneration of 2A.

Parshall Flume Uranium Discharge
August 1999

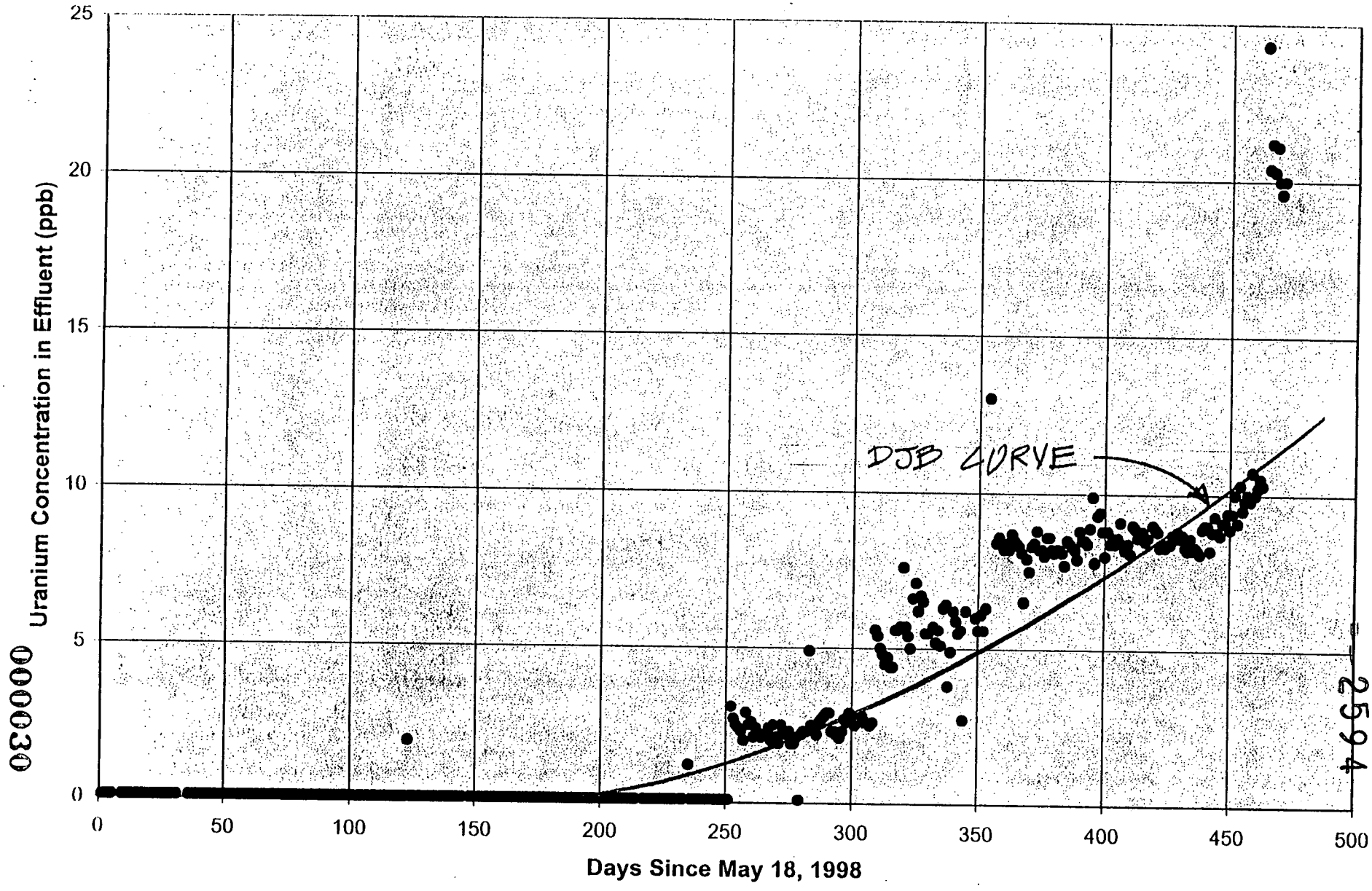


Uranium Concentration in Effluent of Lag Vessel, Train One from May 18, 1998 through August 31, 1999



6200000

Uranium Concentration in Effluent of Lag Vessel, Train Two from May 18, 1999 Through August 31, 1999



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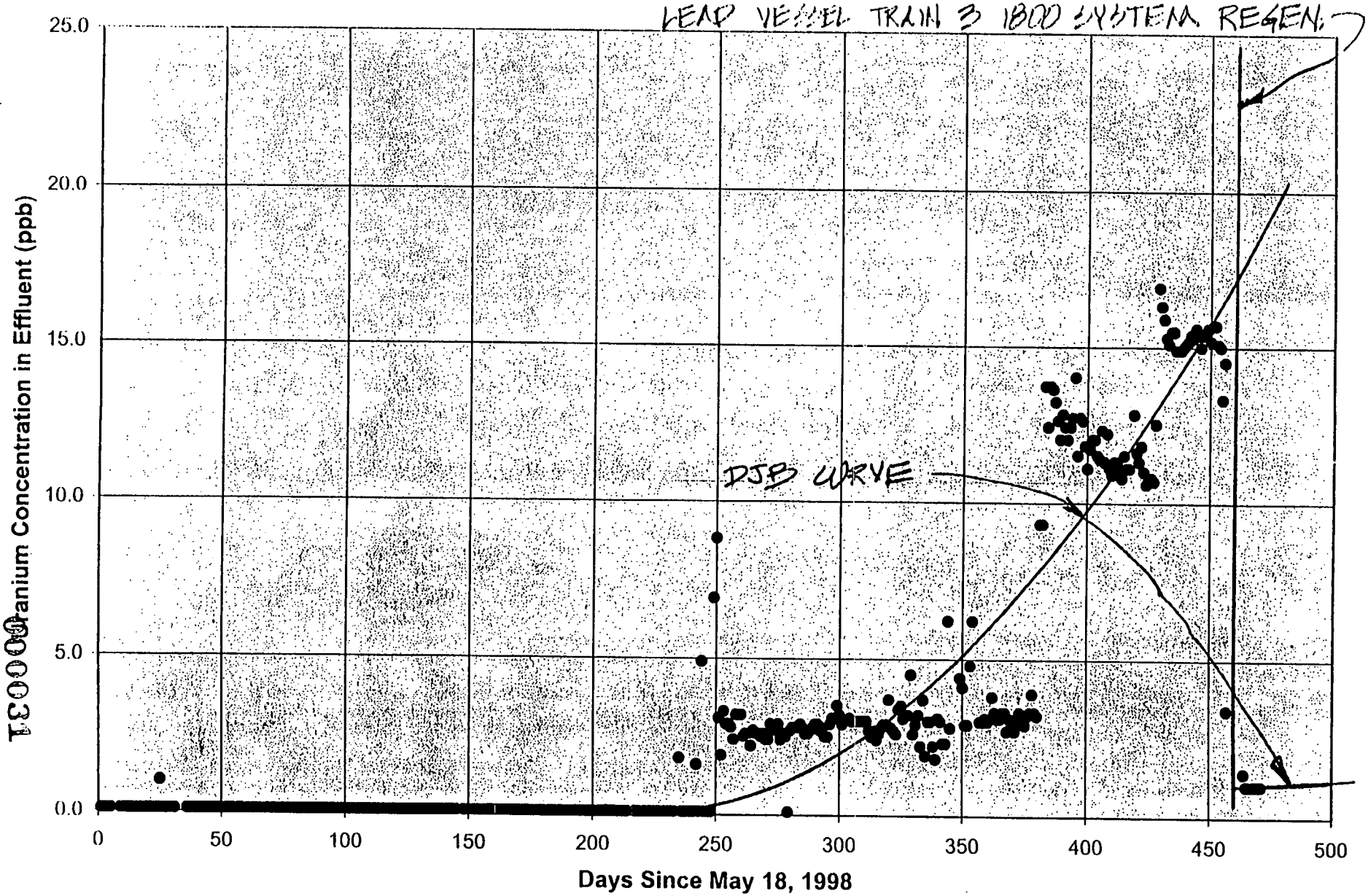
10/4/99

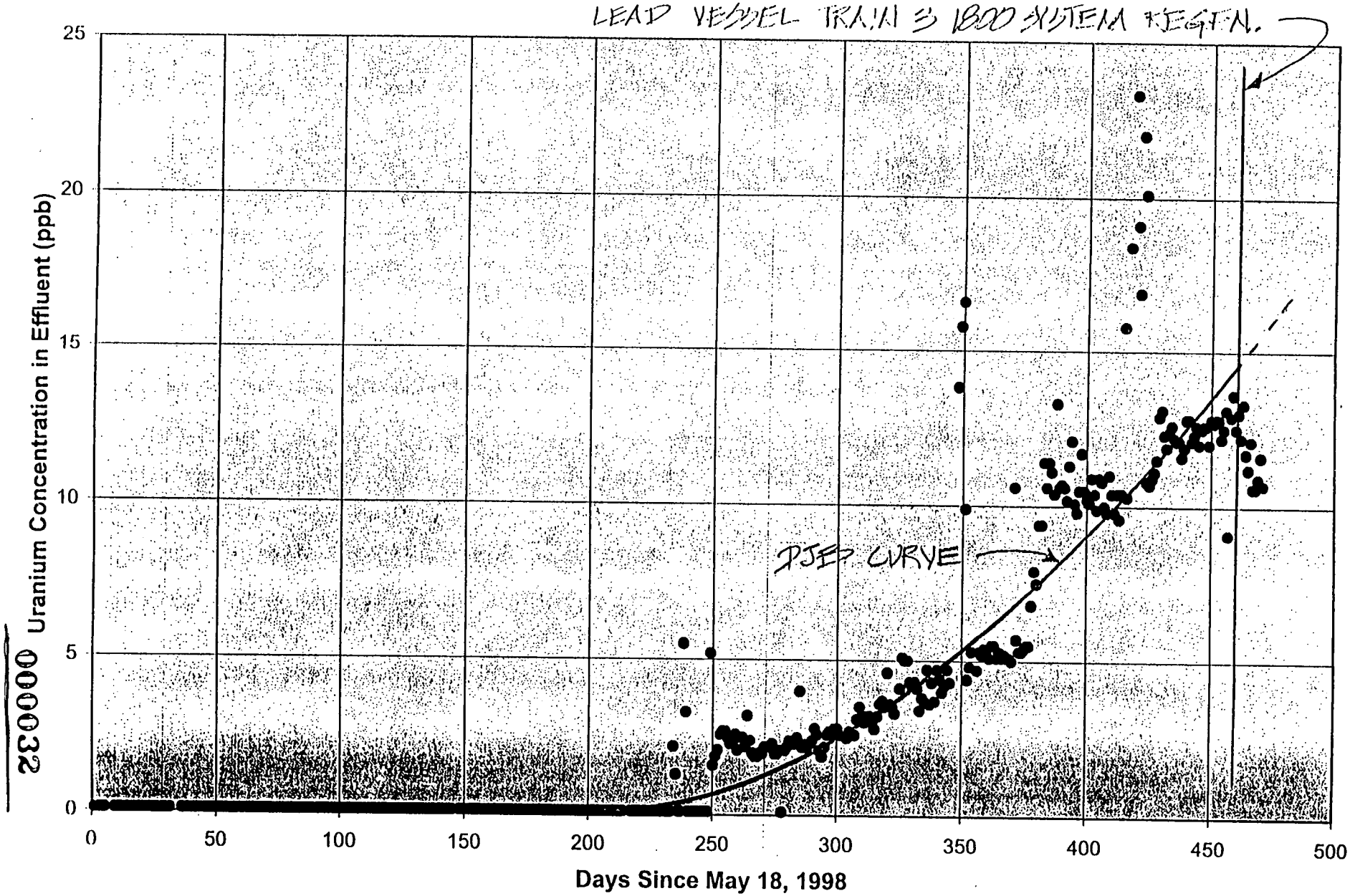
Train 2, lag

Lag-figs

Uranium Concentration in Effluent of Lag Vessel, Train Three from May 18, 1998 Through August 31, 1999



Uranium Concentration in Composite Effluent of IX Expansion Series from May 18, 1998 through August 31, 1999



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10/4/99

1800 effluent, 98 to 99

1800-eff